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PICTURE OF THE MONTH
Meso-Highs and Satellite Imagery

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The meso-High, and how it is produced in an intense thunderstorm area, has been previously explained by Fujita (1963). The passage of the meso-High's outer boundary is usually accompanied by rain, a vector wind shift, a decrease in surface temperature, and a pressure surge. The intersection of a meso-High boundary with other boundaries (fronts, squall lines, other meso-Highs, mountains, etc.) marks a point with a high potential for intense convective activity.

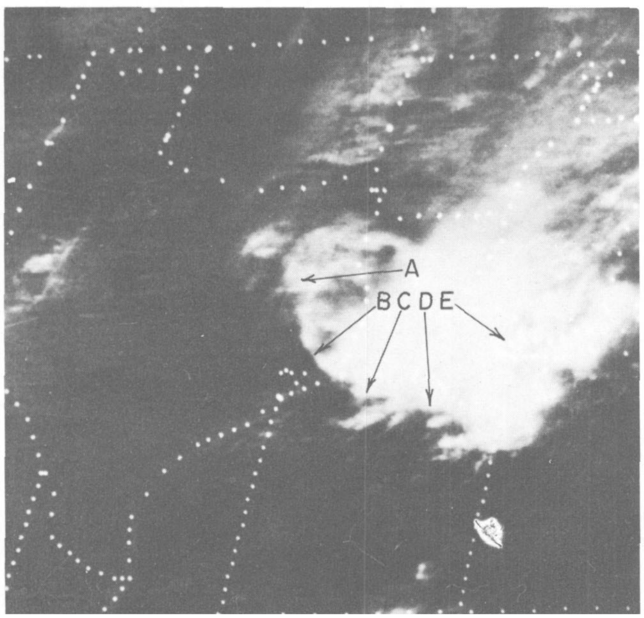

FIGURE 1.—ATS 3 photograph for 1609 GMT, July 30, 1972.

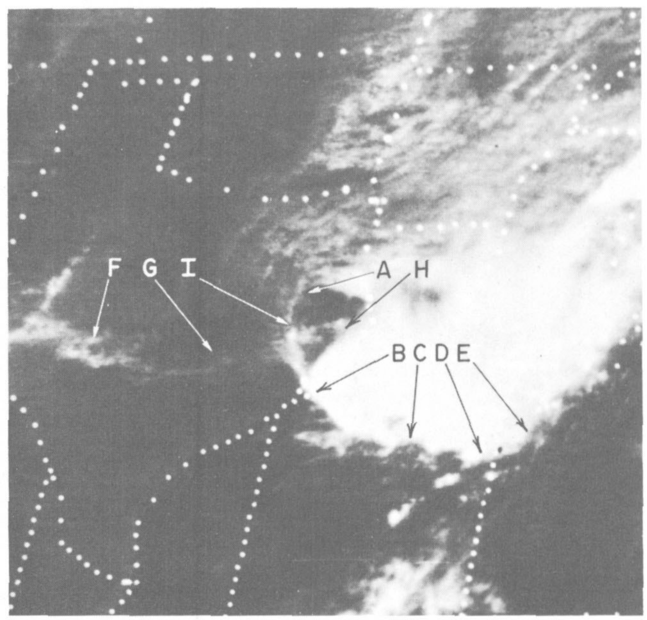

FIGURE 3.—ATS 3 photograph for 1825 GMT, July 30, 1972.

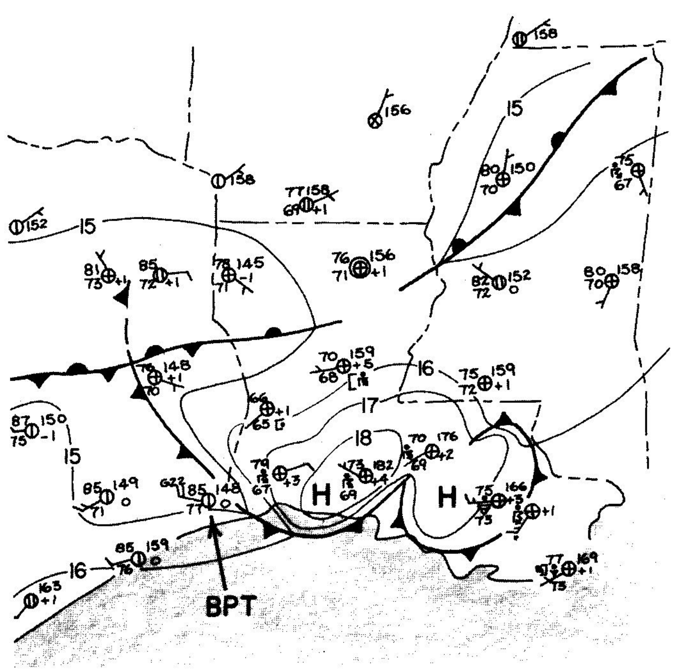

FIGURE 2.—Surface analysis for 1600 GMT, July 30, 1972.

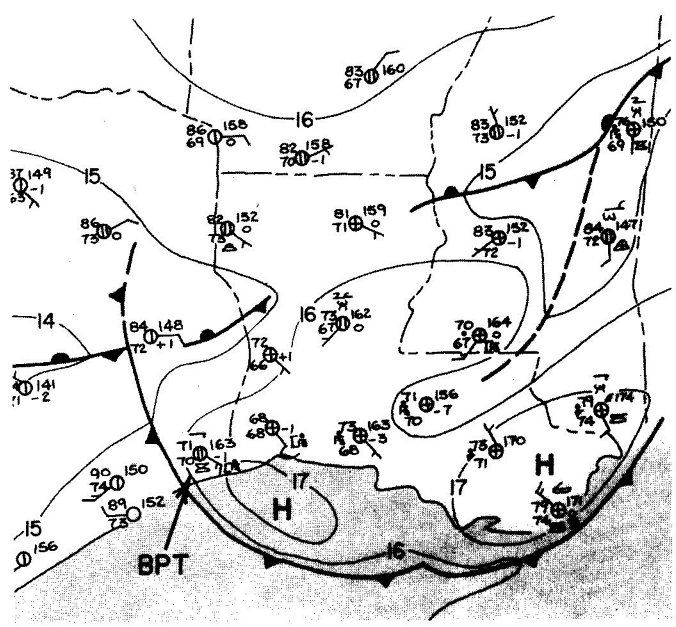

FIGURE 4.—Surface analysis for 1800 GMT, July 30, 1972.

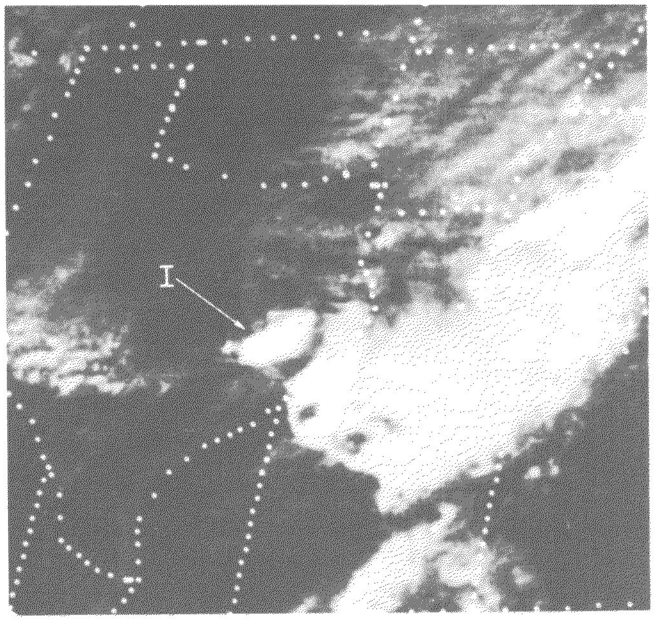

FIGURE 5.—ATS 3 photograph for 2040 GMT, July 30, 1972.

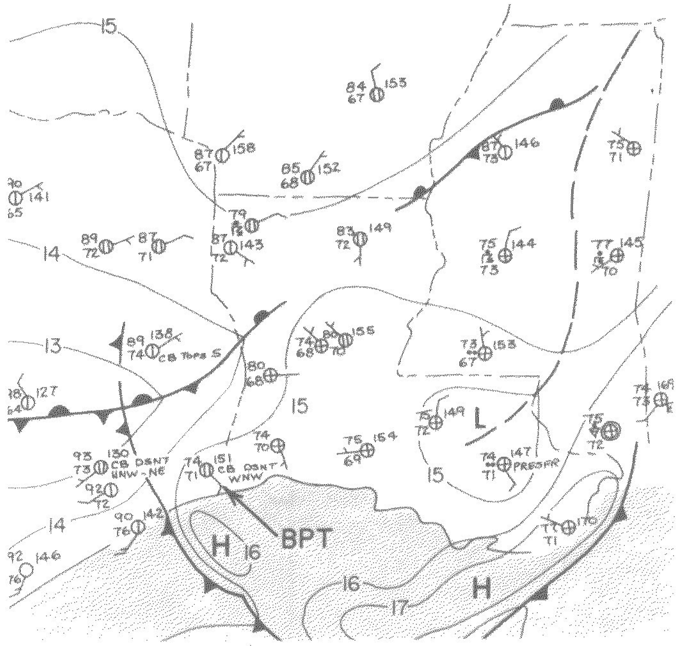

FIGURE 6.—Surface analysis for 2000 GMT, July 30, 1972.

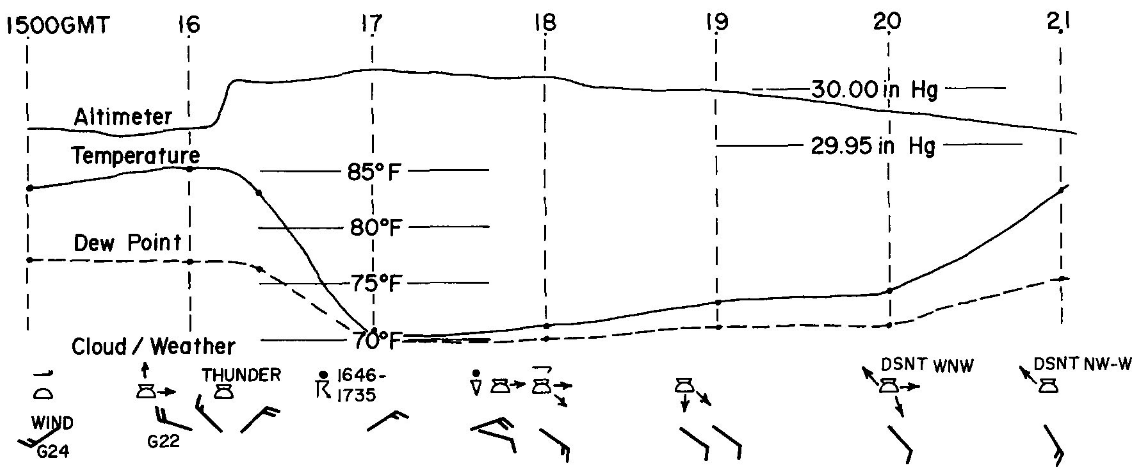

FIGURE 7.—Surface time section (1500–2100 GMT) for Beaumont, Tex., July 30, 1972.

In satellite imagery, the leading edge of the meso-High appears as an arc-shaped line of convective clouds moving out from a dissipating thunderstorm area. The arc-shaped cloud line is normally composed of cumulus, cumulus congestus, or cumulonimbus clouds. Depending on the intensity of the convective activity along the arc line, the meso-High boundary may or may not be identifiable from radar. However, the majority of new convective activity will form along this boundary.

On July 30, 1972, a stationary frontal boundary extended through central Texas and Louisiana. Early morning thunderstorms in Louisiana generated two well-defined meso-Highs. ATS 3 satellite imagery and corresponding surface mesoscale analysis[1] for 1600 GMT are shown in figures 1 and 2.

The arc-shaped cloud boundary extending through A–B–C corresponds to the surface boundary of a meso-High that is plunging southward. The second meso-High boundary from C–D–E is not as apparent in this picture; however, previous pictures had pointed to its existence. By 1800 GMT, both meso-High boundaries had moved farther south as can be seen in figures 3 and 4. The meso-High boundaries are easily detected by the arc cloud A–B–C–D–E. To the west, some cloudiness has begun to form along the stationary front (F–G–H). Notice the brighter cloud (I) where the meso-High's boundary intersects the front: this becomes a very large thunderstorm in 2 hr (I, figs. 5, 6).

Figure 7 depicts graphically what occurred at Beaumont, Tex., (BPT) as the meso-High passed over that station at 1612 GMT. Notice the temperature drop, pressure surge, rain, and vector windshift. This type of weather was typical along the boundary of both meso-Highs.

[1] Surface data are plotted in the normal format except that hourly altimeter changes in 0.01 in. Hg are plotted beneath surface pressure.

REFERENCE

Fujita, Tetsuya, "Analytical Mesometeorology: A Review," *Meteorological Monographs*, Vol. 5, No. 27, Sept. **1963**, pp. 77–128.